CLAIMS

WE CLAIM:

1. A hot gas diverter valve, comprising:

a housing having an inner surface that forms a valve bore therein;

a first fluid inlet port extending through the housing and in fluid communication with the valve bore;

a second fluid inlet port extending through the housing and in fluid communication with the valve bore;

a first fluid outlet port extending through the housing and in fluid communication with the valve bore;

a second fluid outlet port extending through the housing and in fluid communication with the valve bore;

a first inner valve seat disposed within the valve bore and surrounding the first fluid outlet port;

a second inner valve seat disposed within the valve bore and surrounding the second fluid outlet port;

a first outer valve seat disposed within the valve bore, the first outer valve seat at least partially surrounding, and at least partially spaced apart from, the first inner valve seat to form a first flow channel therebetween;

a second outer valve seat disposed within the valve bore, the second outer valve seat at least partially surrounding, and at least partially spaced apart from, the second inner valve seat to form a second flow channel therebetween; and

a valve element freely disposed within the valve bore and translationally moveable between at least (i) a first position, in which the valve element seats against the first inner and first outer valve seats, and (ii) a second position, in which the valve element seats against the second inner and second outer valve seats.

2. The diverter valve of Claim 1, wherein:

the first flow channel is in fluid communication with the first inlet port and the valve bore; and

the second flow channel is in fluid communication with the second inlet port and the valve bore.

3. The diverter valve of Claim 1, wherein the valve element is substantially sphere-shaped.

4. The diverter valve of Claim 3, wherein:

the first and second inner seats and the first and second outer seats are at least partially sphere-shaped.

5. The diverter valve of Claim 1, wherein the first and second fluid outlet ports are positioned substantially opposite one another.

6. The diverter valve of Claim 1, wherein the housing comprises a metal selected from the group consisting of Inconel, ceramic, and Titanium Zirconium Molybdenum.

7. The diverter valve of Claim 8, wherein the housing further comprises rhenium.

8. The diverter valve of Claim 1, wherein the valve element comprises silicon nitride.

9. The diverter valve of Claim 1, wherein the valve element comprises graphite coated with a layer of rhenium.

10. A flow control device for use with a hot gas generator having a pressure vessel and providing a combustion gas output, the flow control device comprising:

a fluidic amplifier having a fluid inlet port and at least two fluid outlet ports, the fluid inlet port adapted to receive hot pressurized fluid from the gas generator pressure vessel; and

a diverter valve including:

a housing having an inner surface that forms a valve bore therein, the valve bore including a first end and a second end,

a first fluid inlet port extending through the housing and in fluid communication with the valve bore,

a second fluid inlet port extending through the housing and in fluid communication with the valve bore,

a first fluid outlet port extending through the housing and in fluid communication with the valve bore first end,

a second fluid outlet port extending through the housing and in fluid communication with the valve bore second end,

a first inner valve seat disposed within the valve bore and surrounding the first fluid outlet port,

a second inner valve seat disposed within the valve bore and surrounding the second fluid outlet port,

a first outer valve seat disposed within the valve bore, the first outer valve seat surrounding, and spaced apart from, the first inner valve seat to form a first flow channel therebetween,

a second outer valve seat disposed within the valve bore, the second outer valve seat surrounding, and spaced apart from, the second inner valve seat to form a second flow channel therebetween, and

a valve element freely disposed within the valve bore and translationally moveable between at least (i) a first position, in which the valve element seats against the first inner and first outer valve seats, and

(ii) a second position, in which the valve element seats against the second inner and second outer valve seats.

11. The device of Claim 10, wherein:

the first flow channel is in fluid communication with the first inlet port and the valve bore; and

the second flow channel is in fluid communication with the second inlet port and the valve bore.

12. The device of Claim 10, wherein the valve element is substantially sphere-shaped.

13. The device of Claim 12, wherein:

the first and second inner seats and the first and second outer seats are at least partially sphere-shaped.

14. The device of Claim 10, wherein the first and second fluid outlet ports are positioned substantially opposite one another.

15. The device of Claim 10, wherein the housing comprises a metal selected from the group consisting of Inconel, ceramic, and Titanium Zirconium Molybdenum.

16. The device of Claim 15, wherein the housing further comprises rhenium.

17. The device of Claim 10, wherein the valve element comprises silicon nitride.

18. The device of Claim 10, wherein the valve element comprises graphite coated with a layer of rhenium.

19. A flight control system, comprising:

a controller operable to supply flight control signals;

a hot gas generator operable to supply a flow of hot pressurized gas;

one or more fluidic amplifier stages coupled to receive the flow of hot pressurized gas from the gas generator and responsive to the flight control signals to selectively divert at least a portion of the received flow of hot pressurized gas into one of at least two amplifier stage outlet ports;

at least two discharge nozzles; and

a diverter valve including:

a first fluid inlet port extending through the housing and in fluid communication with the valve bore,

a second fluid inlet port extending through the housing and in fluid communication with the valve bore,

a first fluid outlet port extending through the housing and in fluid communication with the valve bore first end,

a second fluid outlet port extending through the housing and in fluid communication with the valve bore second end,

a first inner valve seat disposed within the valve bore and surrounding the first fluid outlet port,

a second inner valve seat disposed within the valve bore and surrounding the second fluid outlet port,

a first outer valve seat disposed within the valve bore, the first outer valve seat surrounding, and spaced apart from, the first inner valve seat to form a first flow channel therebetween,

a second outer valve seat disposed within the valve bore, the second outer valve seat surrounding, and spaced apart from, the second inner valve seat to form a second flow channel therebetween, and

a valve element freely disposed within the valve bore and translationally moveable between at least (i) a first position, in which the valve element seats against the first inner and first outer valve seats, and

(ii) a second position, in which the valve element seats against the second inner and second outer valve seats.

20. The system of Claim 19, wherein:

the first flow channel is in fluid communication with the first inlet port and the valve bore; and

the second flow channel is in fluid communication with the second inlet port and the valve bore.